Pro Perma Engineered Coatings

Partnership Research with the ERDC, MS&T and PPEC

Mike Koenigstein

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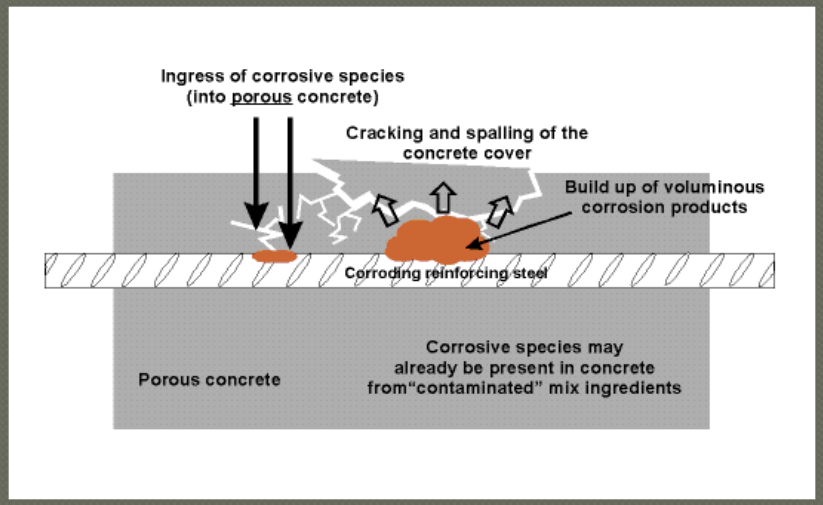
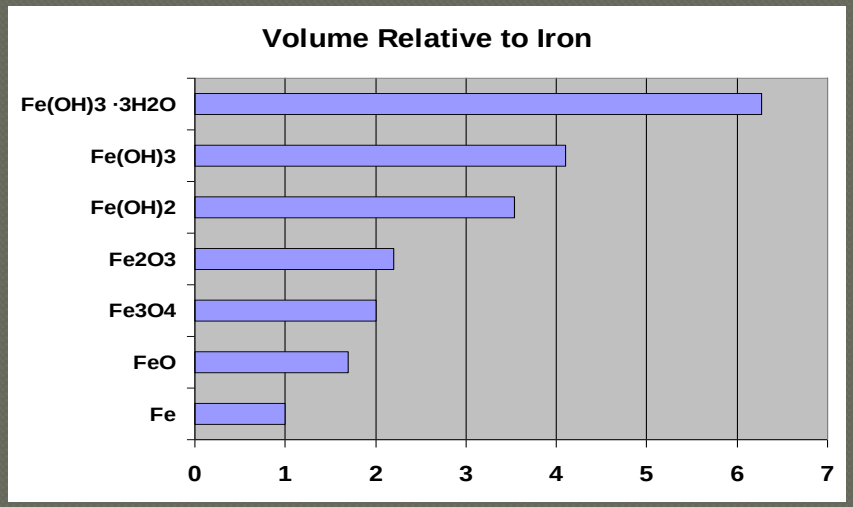
What is the issue?





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Why Enamel?

- The glass layer limits the intrusion of chlorides into the reinforcement by making a protective layer
- Enamel bonds directly with the steel
- Concrete shrinkage is limited or non-existent
- It is a known product, around for centuries
- Can be applied to virtually any kind of metal substrate

Initial Studies

- ERDC began looking into enameling as a way to increase strength and limit corrosion
- ERDC did preliminary data
- Partnered with outside sources to bring the technology forward
- PPEC was an early proponent of this technology providing samples

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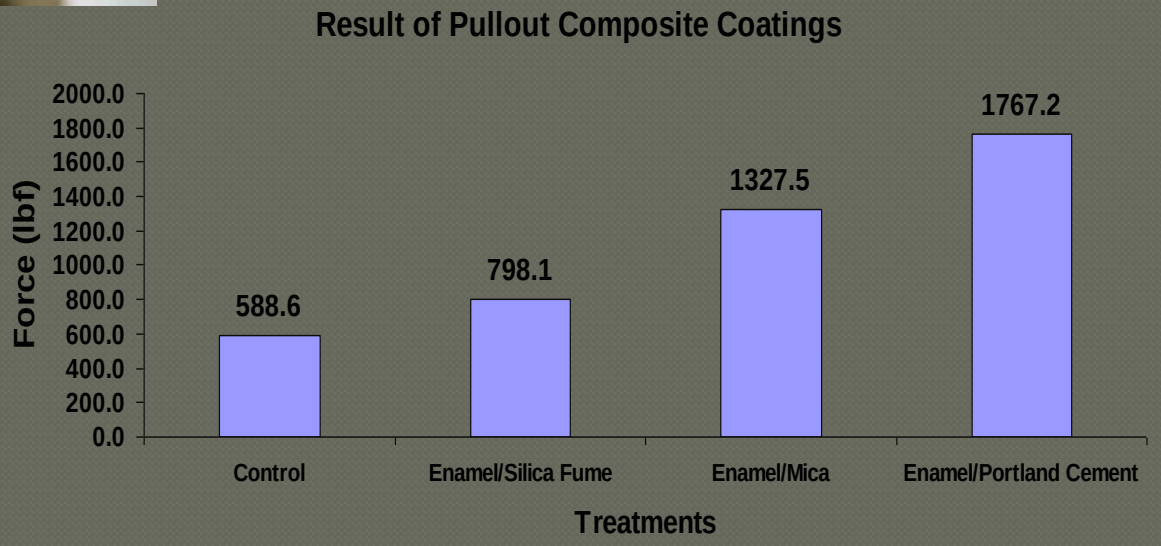
Data From ERDC



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Why Joint Research?

- Gain access to brighter minds.
- Participate in the discovery of new or novel ideas.
- Gain a different perspective of the technology
- Make sure that the idea was a good one.

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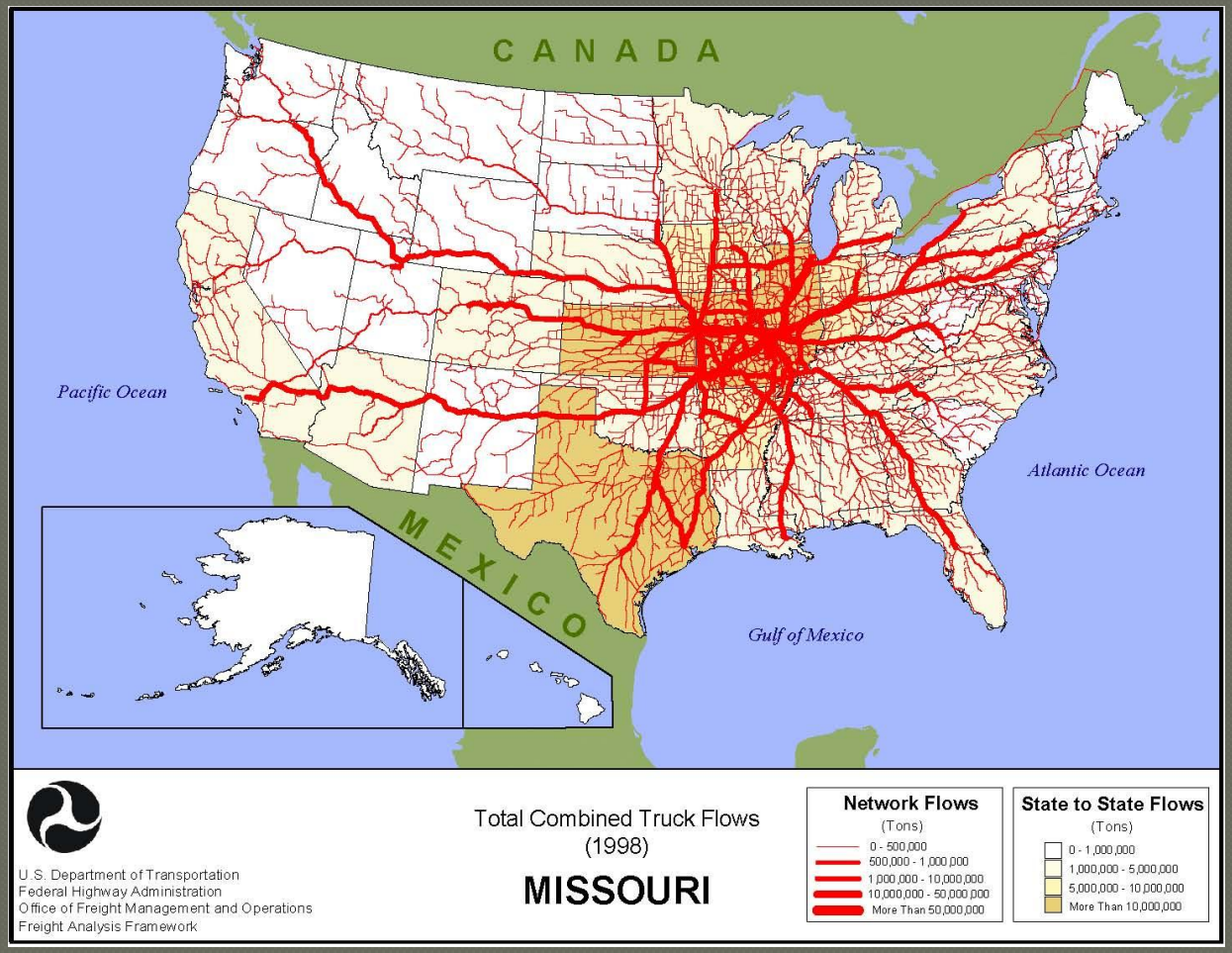
Why MS&T and Missouri



Interesting Items

- Bond between concrete and coated rebar keeps increasing

Strength and Corrosion Resistance

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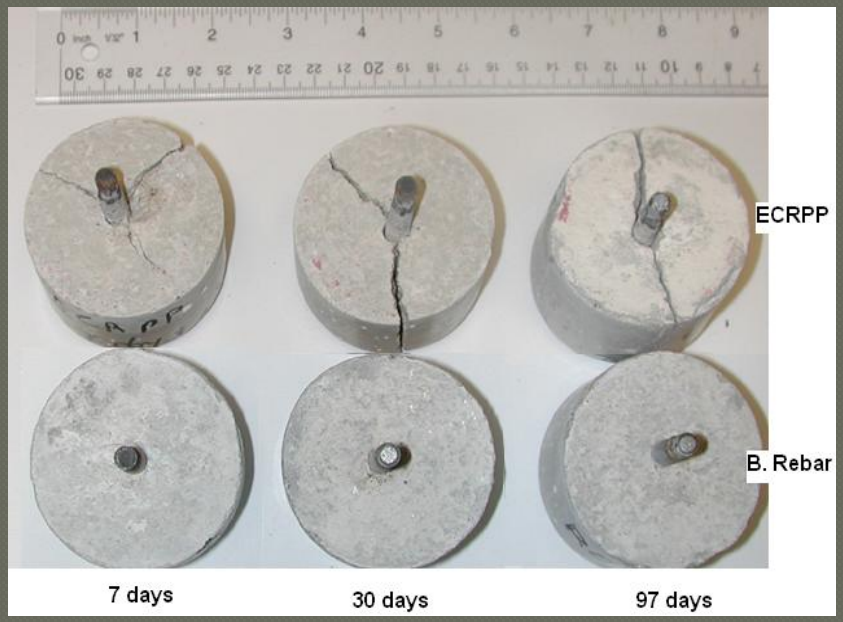
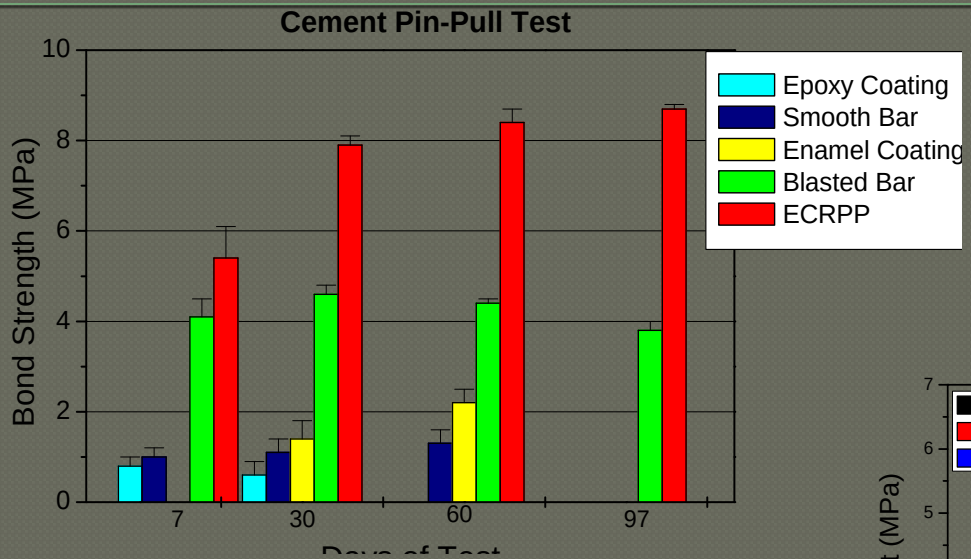
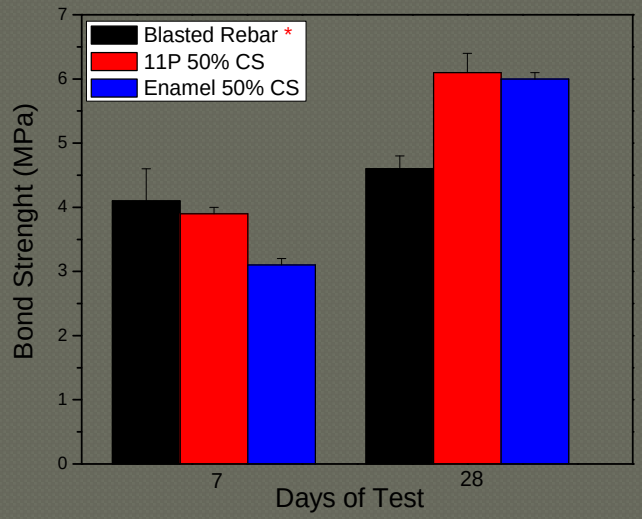
- Our material will promote bond strength with the concrete interface (an improvement of at least 3 times greater than regular rebar) while also inhibiting corrosion.
- We use processes that have been around forever. Equipment needed (but not optimized) can be bought today.



Increase in Strength





* 12/2008

Testing done at Missouri S&T

Interesting Items

- Bond between concrete and coated rebar keeps increasing
- Some interesting behaviors from the coating

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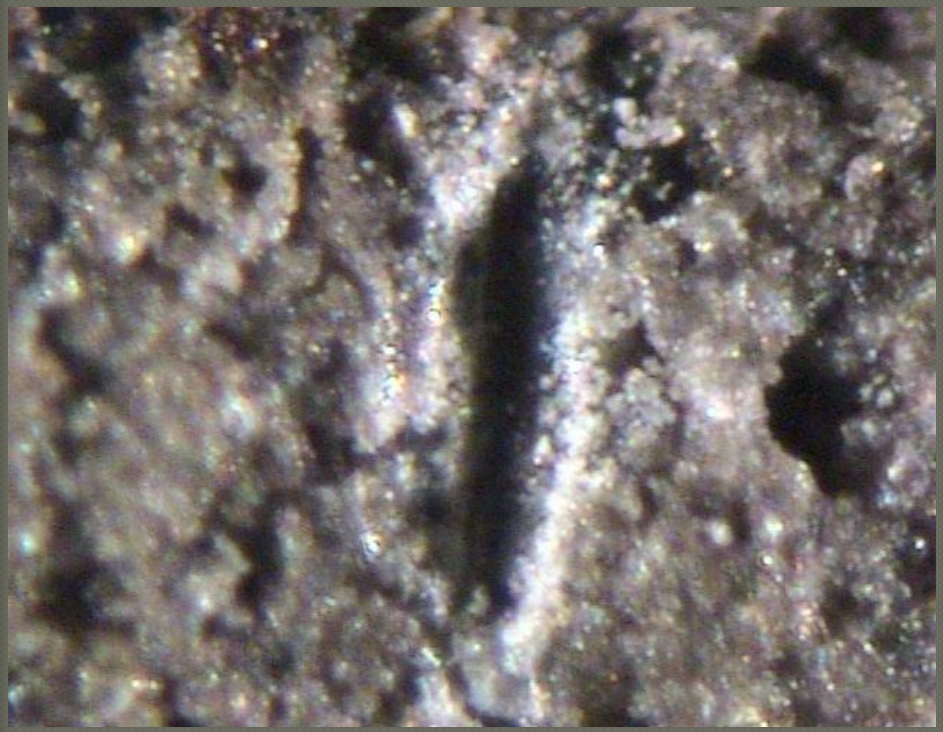
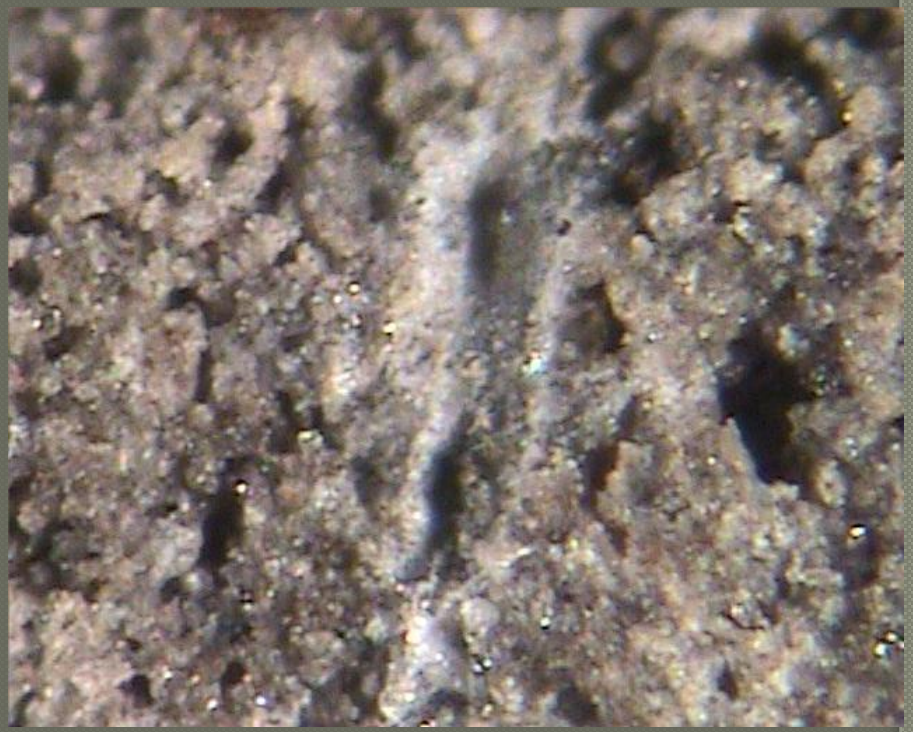
Self Sealing!



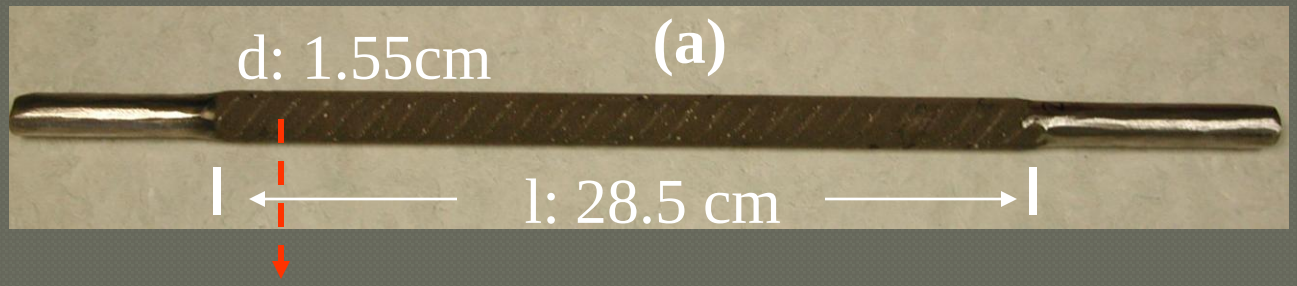


Before

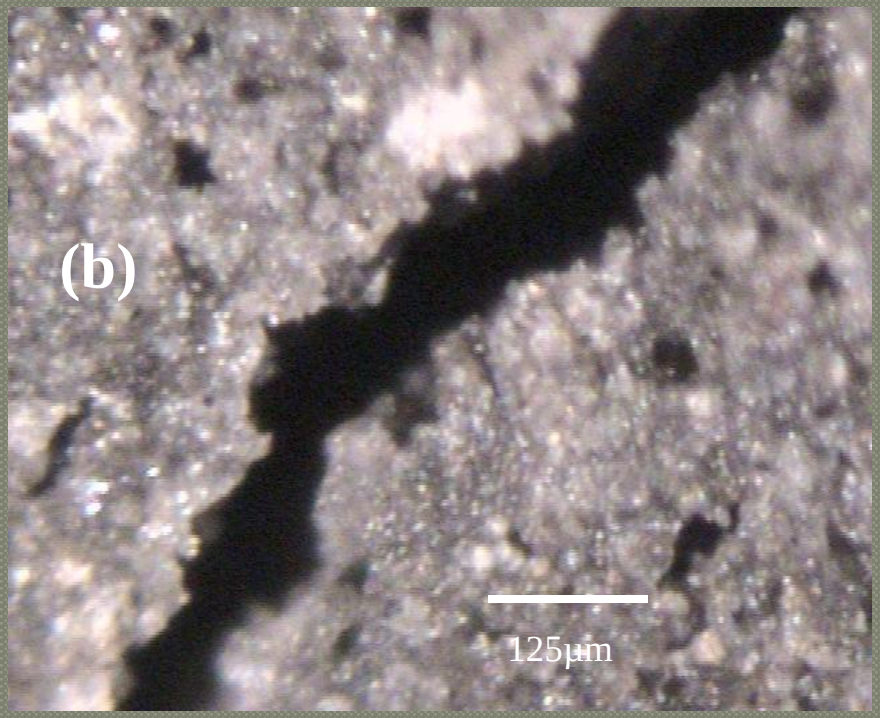
After

24 hours submerged in Distilled Water

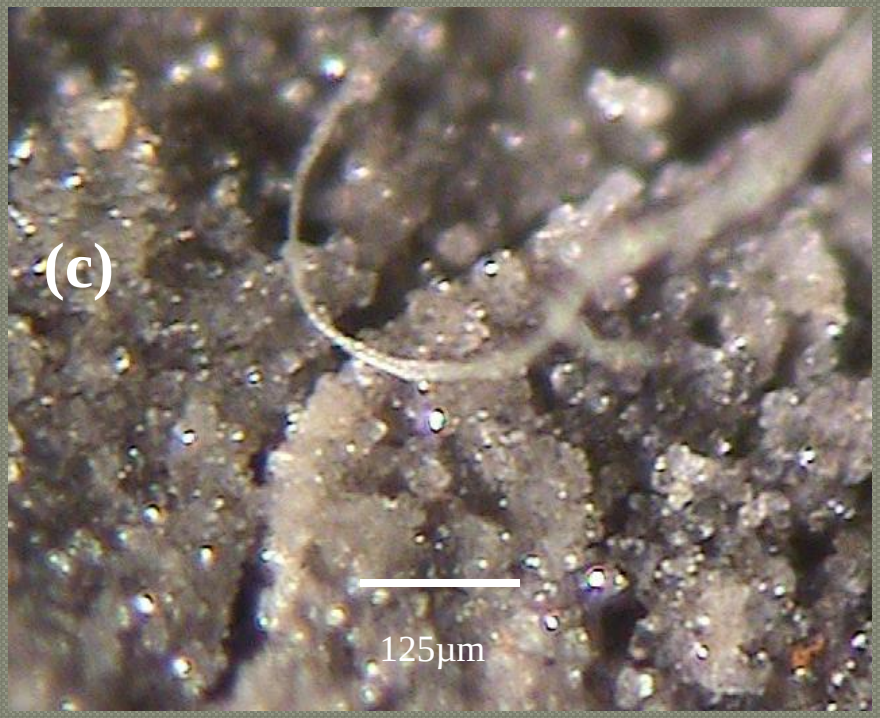
Enameled Rebar (sample 4)



Before immersion in Distilled water



24h in Distilled water



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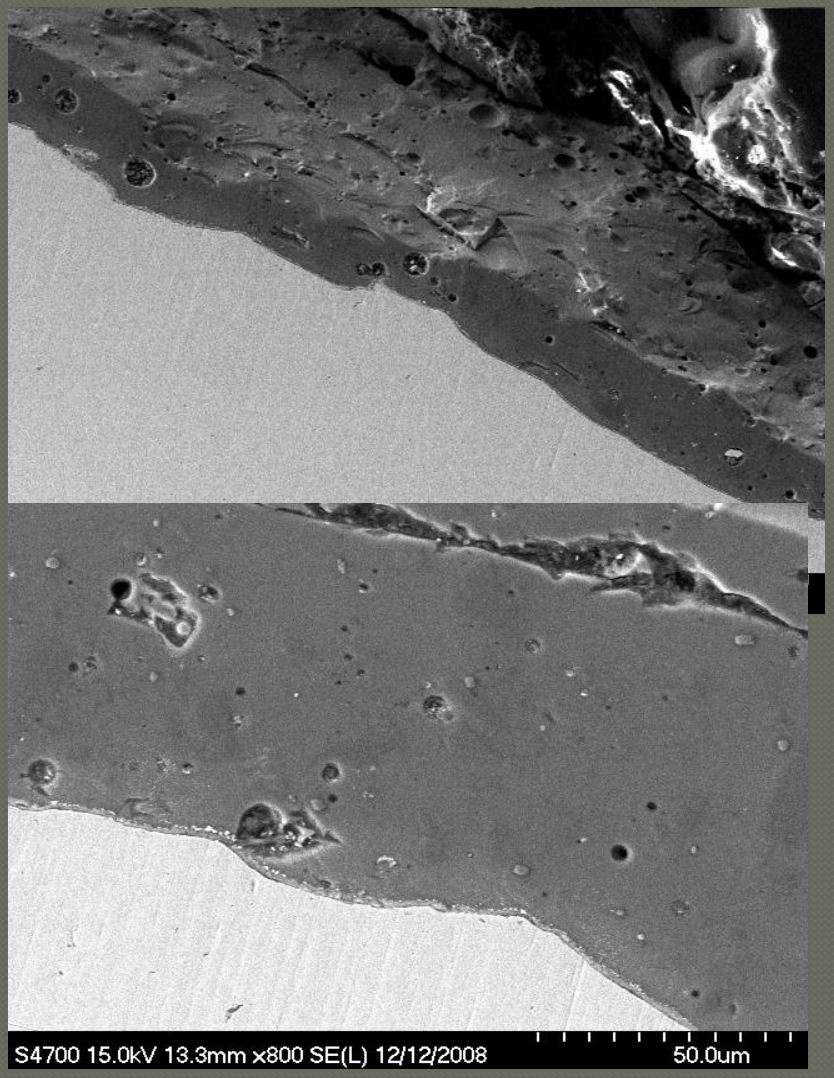
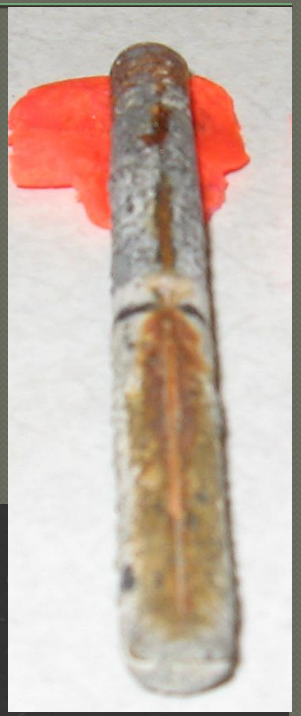
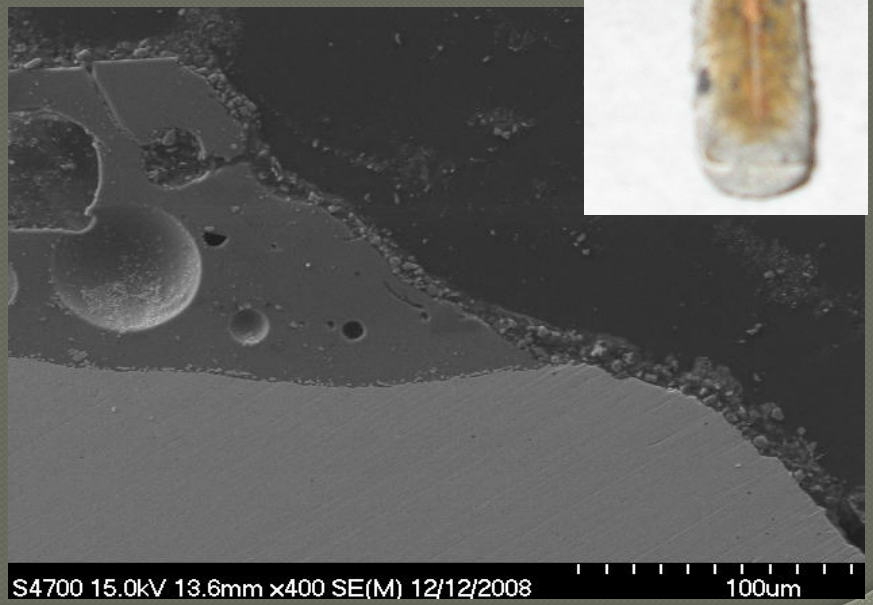
Pictures of the Coating







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Issues

Research has shown that we must make a more consistent glass layer on the part.

We need to modify our production to allow some different methods of application

Manufacturing items:

1. Trying to get a certain % of active component
2. How to get the material into the matrix efficiently
3. Optimizing the glass layer

Current Work

- PPEC has placed rebar at Corpus Christi
- We have other projects through the Corps
- Missouri has committed to doing a bridge at the conclusion of our research

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Conclusion

- We are not a new technology, but rather a hybrid.
- We have a technology that has been transitioned, is going through applied research, and in the demonstration phase
- The technology can be sold commercially and needs to be optimized